2nd Asia-Pacific Conference on Plasma Physics, 12-17,11.2018, Kanazawa, Japan

The sterilization and quality improvement of rice flour by dielectric barrier discharge (DBD) plasma

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Up to 40% of women use talcum powder at least occasionally. One of these is loose face powders that are comprise of talc, zinc oxide and titanium dioxide. There is a plausible mechanism by which talc could promote lung cancer. Corn, potato or rice starch are the natural alternatives powders to using for talc-free powders. The dielectric barrier discharge (DBD) plasma is suitable for improving the properties of rice flour for loose face powders due to the cold plasma processing has been used for sterilization, functionalization, inactivation of enzymes, altering the hydrophilic/hydrophobic properties and etching. Rice flour samples were treated at the plasma dissipated power 80 watts. During the plasma process, the OES was observed, the main plasma species are OH, N_2, and O_2. The O_3 concentration was measurement by using the gas detectors. The results found that DBD plasma can sterilize the rice flour by the OH and O_3 and efficiency was increased with raising treatment time. Water absorption was decreased but oil absorption was increased by physical properties and chemical properties. The physical properties are the roughness and fine grains structure on the surface. The chemical properties are reduction of functional groups by cross-linking on the rice flour surface. This experiment surface morphology was studied by SEM and the surface chemistry was analyzed by ATR-FTIR and XPS. The finally, DBD plasma technology is an alternative for the sterilization and quality improvement of rice flour for using the production of loose face powders.

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